DRISI

Caltrans Division of Research, Innovation and System Information

Research Results

Integrating Multimodal Data for a Broader View of Transportation Planning

Combining travel demand data with cost-benefit analysis leads to a better understanding of how different modes of transportation impact the network

Modal

FEBRUARY 2016

Project Title:
Integrating Highway and Transit Data into Benefit-Cost Analysis

Task Number: 2627

Start Date: July 9, 2014

Completion Date: May 1, 2015

Product Category: New or improved decision support tool, simulation, model, or algorithm (software)

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WHAT WAS THE NEED?

The nation's departments of transportation are shifting from being primarily highway-building organizations to developing multimodal transport systems, as exemplified by the Caltrans mission statement adopted in 2014: Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability. Major investments in transportation infrastructure and services require careful evaluation to assess the benefits and costs. Benefit-cost analysis (BCA) is a common framework for determining which projects maximize social welfare and bring the greatest good. Ideally, BCA weighs all aspects of a project, but BCA tools can only measure the effects for which data is provided. The Caltrans BCA transportation models do not fully account for multimodal network impacts because of insufficient data regarding public transit, walking, and other modes of transportation and their effect on local streets and the larger transportation network, causing Caltrans BCA decision-making models to be less multimodal than optimal.

WHAT WAS THE GOAL?

The goal was to explore ways of incorporating data about multimodal network impacts to develop more integrated BCA models for transportation planning and shaping public policy.

Caltrans

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WHAT DID WE DO?

Caltrans worked with the Mineta National Transit Research Consortium to explore methods of integrating multimodal data to improve BCA. The project evaluated past policy decisions and current planning and programming for future transportation investments. The researchers reviewed the activities of various Caltrans divisions that influence the planning, monitoring, and managing of the transportation system to identify opportunities for increasing the integration of public transit. The primary BCA model that Caltrans uses—the Cal B/C spreadsheet—is unimodal when evaluating highway and road investments, and important effects from induced demand are ignored in the analysis. BCA is an informative performance measure, but to gain a broader perspective, it is important to consider other models, especially travel demand models (TDM) that combine traffic data with other known data, such as population, employment, trip rates and destinations, and travel costs. To tackle these shortcomings, the researchers modified the Cal B/C model by adding a function that estimates induced demand and suggested changing the method of use to better account for multimodal systems and network effects.

WHAT WAS THE OUTCOME?

To address the lack of available data and integration problems, the research recommended the following.

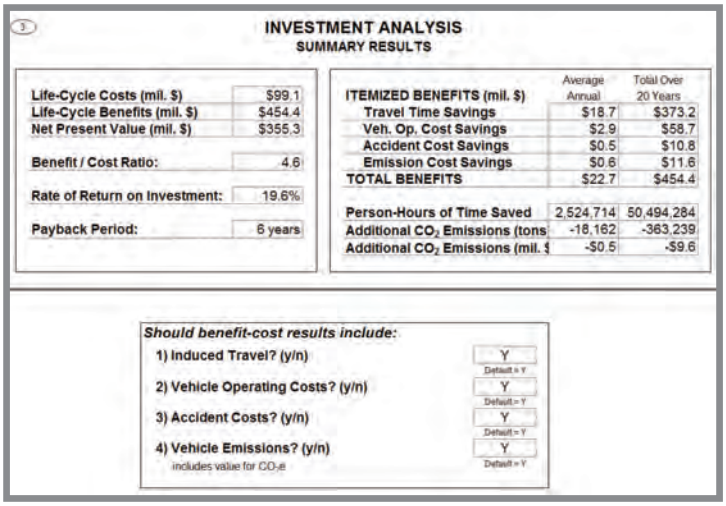
- Improve Cal B/C—Add an induced demand function to the model syntax. Improve multimodal documentation and outreach to encourage Caltrans usage.
- Integrate Cal B/C and TDM models—Encourage Cal B/C users to incorporate TDM data, and use a BCA post-processor for TDM data.
- Address management and contracting practices at Caltrans—Promote closer collaboration between economic analysts and traffic forecasters. Take advantage of external expertise while ensuring that in-house knowledge is adequate to implement state-of-the-art models and methods.

WHAT IS THE BENEFIT?

When investing in transportation, effective decision-making begins with sound estimates of the current and future demand for facilities and services, which includes data about trip destinations and volumes, population and land use, environmental and safety concerns, and travel costs. Today, transportation planning requires more integrated and comprehensive models to capture multimodal data. This research has proposed ways to integrate the data into existing processes and activities to better account for multimodal network effects and foster awareness when forming transportation policy and analyzing projects.

LEARN MORE

To view the complete report:
www.sjsu.edu/people/matthew.holian/docs/integrating_3_9_2015.pdf



View from a Cal B/C results worksheet for a lane addition project